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A REVISION OF ELYTROPAPPUS Cass.

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(With drawings by the Author.)

INTRODUCTION.

Seventy years have elapsed since the publication of Volume III of the Flora Capensis, and it is therefore no matter for surprise that much of the work in that volume is out of date. The prospects of a complete revision of the earlier volumes of the Flora Capensis are remote, and it is therefore desirable that the revision of individual genera should be undertaken. The need is specially urgent in those genera containing plants of economic importance, such as *Elytropappus*.

In a recent paper<sup>1</sup> the writer has shown that several changes in nomenclature are necessary in this genus and in the present paper these changes are adopted. In one case (*E. longifolius* of this paper) careful examination of the floral parts made it clear that this plant differs in too many characters from *E. glandulosus* Less. for it to remain satisfactorily as a variety of that species. Consequently it has been given specific rank.

SUB-DIVISIONS OF THE GENUS.

Within the genus the species group themselves into three natural sections, as follows :—

- I. *E. cyathiformis* DC  
*E. hispidus* Levyns
- II. *E. longifolius* Levyns  
*E. gnaphaloides* Levyns  
*E. scaber* Levyns  
*E. glandulosus* Less.
- III. *E. rhinocerotis* Less.  
*E. adpressus* Harv.

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<sup>1</sup> Notes on Nomenclature in some Members of the Compositae. Margaret R. Levyns. Trans. Roy. Soc. S.Af. XXIII (1935). p. 91

Very little is known about the plants belonging to the first section. *E. hispidus* on which Cassini founded the genus *Elytropappus*, has not been collected since its discovery by Thunberg, and *E. cyathiformis* is only a little better known. The writer was fortunate in finding the latter species growing in the mountains in Elands Kloof Pass, where it occurs between the altitudes of 3,000 and 4,000 feet. The flowering season was over but a few heads retained their dried flowers and fruits, thus making it possible to augment the existing descriptions of the species. Its restricted altitudinal range and its preference for coarser grained soils were striking. In this section the capitula are grouped in dense terminal heads, the head resolving itself into its constituent capitula only on a close examination. In the other sections the individual capitula are easily observed. A parallel may be drawn here with the genus *Stoebe* where the section to which *S. aethiopica* belongs

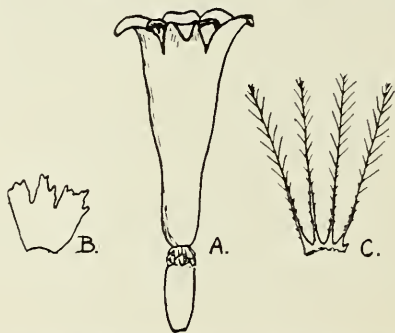


FIG. 1. *Elytropappus longifolius* (DC) Levyns. Drawn from Drège 49698 in the herbarium of the South African Museum. A. Floret with pappus removed  $\times 14$ . B. A single scale from the ovary  $\times 70$ . C. Part of the pappus  $\times 14$ .

shows the same massing of capitula in terminal heads with the boundaries of the capitula obscure. The majority of species in *Stoebe* agree with most in *Elytropappus* in having distinct capitula, even where they are massed in heads.

Section II is characterised by its glandular hairs, and by its leaves which are never tightly adpressed to the stem though they may be erect. *E. longifolius* is a somewhat aberrant species both in the shape of its corolla (fig. 1) which is wider in the upper part of the tube than is the case in the other species, and in the entire absence of the rim outside the feathered pappus. This rim which has been regarded as a generic feature is completely lacking and the top of the ovary is covered with a series of downwardly directed, overlapping scales of delicate texture.

The pappus does not persist attached to the achene but falls off as the flower withers. In spite of these unusual features it seems best to place this species in this section. There is some evidence to suggest that hybridisation between it and *E. gnaphaloides* and *E. glandulosus* occurs.

Members of Section III have not the conspicuous external glands of Section II but on drying produce a sticky exudation which causes the plants to stick to drying paper. This feature is never present in Section II. The adult leaves are tightly adpressed to the stem for their whole length.

#### HYBRIDISATION.

This appears to be a factor of considerable importance in the genus, which is to be expected in view of the tendency of many of the species to grow socially with one another to the partial exclusion of other plants. Members of Sections II and III all flower at approximately the same time (February to May), affording favourable opportunities for crossing. For some time the writer has been convinced that hybridisation is common in the genus, and field studies have only served to strengthen the conviction. Reference to one locality will illustrate the support that field work gives to the hypothesis of hybridisation.

At the Ceres end of Elands Kloof Pass in the Cold Bokkeveld, six of the eight species are present, and distributed as follows :—

*E. adpressus* abundant on sandy plains at the entrance to the kloof ; becoming less common on the slopes and at high altitudes.

*E. rhinocerotis* not common and only seen at altitudes of about 4,000 feet, in places where *E. adpressus* is rare or absent.

*E. gnaphaloides* not very common.

*E. scaber* frequent, ranging from the flats to about 4,000 feet.

*E. glandulosus* rare on the sandy flats but becoming very common on the slopes and reaching an altitude of about 5,000 feet.

*E. cyathiformis* frequent but local on the slopes from 3,000 to 4,000 feet.

*E. cyathiformis* flowers earlier than the other species and no suspected hybrids were seen.

*E. rhinocerotis* and *E. adpressus*, though known to hybridise freely in other areas (notably the Koo between Montagu and Matroosberg), showed no evidence of it here. This is probably due to the fact that their areas of distribution in this neighbourhood are not the same.

All the remaining species appeared to be hybridising freely. Attempts were made to determine the possible parents in some of these suspected hybrids, these being judged by their vegetative and floral characters and also by the occurrence of the putative parents in the same locality. The following were the results :—

*E. scaber* × *E. glandulosus* (Levyns 4924, 4928, 4929, 4931).

*E. glandulosus* × *E. gnaphaloides* (Levyns 4889).

*E. scaber* × *E. gnaphaloides* (Levyns 4923).

In a neighbourhood where so many closely related species are growing together it would be surprising if hybrids did not arise.

The presumed hybrid *E. scaber* × *E. gnaphaloides* has been found on the mountains near Muizenberg where *E. scaber* is very common and *E. gnaphaloides* occasional.

A specimen at Kew, collected by Kuntze at Caledon, is possibly a hybrid between *E. glandulosus* and *E. longifolius*. Another, Burchell 7965, combines the characters of *E. longifolius* and *E. gnaphaloides* and may be a hybrid. This is given support by the fact that both the species in question are known to occur at Genadendal where Burchell collected his specimen.

In both Sections II and III hybridisation appears to occur. So far inter-sectional hybridisation has not been observed even when the species are growing massed together.

#### VARIATION.

Field workers will find themselves in complete agreement with Vavilov<sup>1</sup> when he says that the monotypic nature of many wild Linnaean species will only be upheld as long as they are studied by means of a few herbarium specimens. Once the botanist goes into the field he cannot but be struck by the polymorphic nature of most species.

In the absence of breeding tests or cytological examination the worker will be faced with the difficult and sometimes insoluble problem of distinguishing between true variations and aberrant forms due to hybridisation. In a genus such as this the task is unusually difficult owing to the gregarious habits of the species. Only in localities in which one species alone is growing can any trustworthy observations on polymorphism be made. The outstandingly polymorphic species in *Elytropappus* are *E. rhinocerotis* and *E. gnaphaloides*, the two most widely spread species in the genus. Variations have also been observed in *E. scaber* and *E. glandulosus*.

<sup>1</sup>The Law of Homologous Series in Variation. N. Vavilov. Journ. Gen. XII (1922). p. 45.

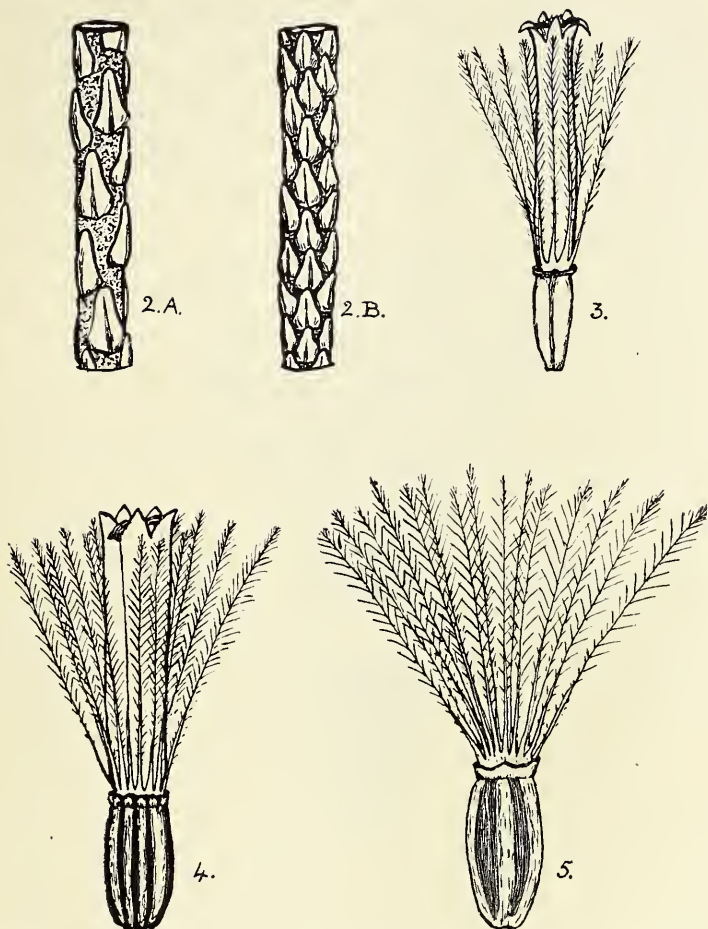


FIG. 2. *Elytropappus rhinocerotis* Less. Portions of two shoots. A. Form with elongated axes. B. Form with condensed axes and smaller leaves. The stems are densely covered with white wool, hence A appears more grey than B. Drawn from two plants growing side by side  $\times 8$ .

FIG. 3. *Elytropappus glandulosus* Less. Single floret  $\times 14$ .

FIG. 4. *Elytropappus gnaphaloides* Levyns. Floret  $\times 14$ .

FIG. 5. *Elytropappus rhinocerotis* Less. Form with an unusually well-developed rim outside the pappus  $\times 14$ .



With regard to purely vegetative features the most common variant is that in which the internodes are much contracted and the leaves, which are shorter than usual, much crowded in consequence. The general telescoping of the parts extends to the inflorescence axes so that the groups of capitula are sessile or nearly so. The result is a plant very different in appearance from the plant with more elongated axes, (fig. 2). When this type of variation was first noted in *E. rhinocerotis* it was thought that possibly two distinct species were involved.<sup>1</sup> An

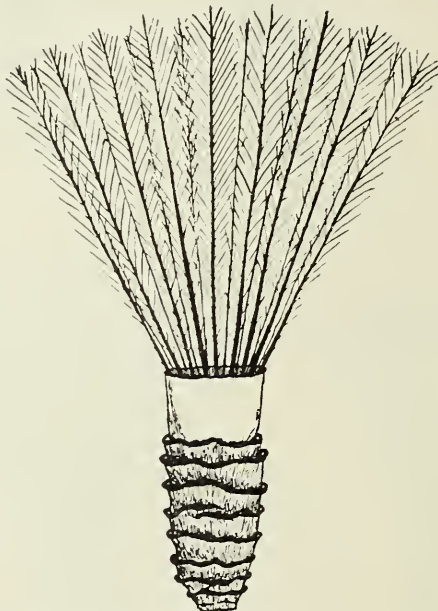


FIG. 6. *Elytropappus cyathiformis* DC. Drawn from the type specimen  $\times 14$ .

extended study of the genus has shown that the same type of variation is present in *E. gnaphaloides* and *E. scaber*. In the writer's opinion such variations are non-specific in value. The character of the achene, an important diagnostic feature, remains unchanged in these variants.

A very variable character in the flower, best seen in the fruiting stage, is the so-called annulus. This in the majority of cases consists of a well defined rim around the top of the achene (figs. 3, 4), but occasionally it develops into a cup-like structure which is frequently termed the outer

<sup>1</sup> A Preliminary Note on the Rhenoster Bush and the Germination of its Seed. Margaret R. Levyns. Trans. Roy. Soc. S.Af. XIV (1926) p. 383.

pappus. This excessive development may be seen in *E. gnaphaloides* and *E. rhinocerotis* (fig. 5) where a rim-like annulus is the normal condition.

The known variability of this character in these widespread species renders the use of this character as a diagnostic feature in any species open to very serious objections. A case in point is *E. cyathiformis*, founded by De Candolle on a specimen collected by Drège with an unusually well developed annulus (fig. 6). This figure was drawn from the type specimen now at Geneva. Until recently this was the only plant known. A little further south in the same series of mountains Schlechter in 1897 collected a specimen identical with that of Drège excepting that it lacked this cup-like structure outside the pappus. There is a well-developed rim in the place of the cup in Drège's plant. Recently the writer collected a large number of plants of this species in the Cold Bokkeveld, not many miles from Schlechter's locality. All the Cold Bokkeveld specimens agree with that of Schlechter. In view of the known variability of this feature in other species the writer has emended De Candolle's description to include these southern forms in *E. cyathiformis*, which now unfortunately has a somewhat inappropriate name.

#### DISTRIBUTION.

With the exception of *E. rhinocerotis* and possibly *E. adpressus*, the species of *Elytropappus* do not extend outside the boundaries of the south-western flora and are concentrated in the western part of the Cape Province. In this western concentration they agree with most other typical Cape plants that have been studied. Owing to their insignificant appearance and the fact that most of them flower in the autumn, a season much neglected by collectors, the records are rather scanty, and hence data for a full discussion of their distribution are not available.

*E. rhinocerotis* (the rhenoster bush), the one species which extends outside the limits of the south western flora, is remarkable in many ways. It has the aggressive habits of an alien and has often been regarded as such, though there are no foundations for this belief in the generally accepted sense. Within the south western districts it is largely confined to fine grained soils, covering large tracts of country. Owing to the dominance of this shrub such country is termed rhenosterveld. On the borders of the coastal belt and the karoo, rhenosterveld forms an interesting transitional zone which may be well seen near Ladismith in the Little Karoo. Here the kopjes to the South of the Klein Zwartberg run in an East and West direction. On the exposed northern slopes a succulent, karoid type of vegetation is present whereas on the southern slopes typical rhenosterveld is produced. The tops of the kopjes may or may not be crowned with a small strip of Cape flora. A little further East,

near van Wyk's Dorp, *E. rhinocerotis* appears to lose its dominant character and it appears as a normal constituent of vegetation that has not the general floristic features of the Cape flora, and shows a large admixture of eastern shrubs. It is possible that this type of habitat is the primitive one for *E. rhinocerotis* and that when it assumes an aggressive role it is actually an invader, and is therefore just as much an alien in those parts as if it had come from a foreign country.

In the Roggeveld at an altitude of about 4,000 feet *E. rhinocerotis* becomes less general in its distribution and for the most part is confined to the water courses. In such localities it sometimes reaches a height of 8 feet.

One of the striking features of this species is its plasticity. It succeeds in holding its own in both the summer and winter rainfall areas, and is equally at home in the mild coastal climate and in places where severe frosts are the rule during the winter months. There seems to be one factor, however, which provides a check on its distribution, and that is shade. How far the adult plant will tolerate shade is not known, but in the critical stages of seedling development even a small degree of shade is sufficient to kill off the young plants.

#### ACKNOWLEDGMENTS.

I am much indebted to the Director of Kew for permission to work in the herbarium and for obtaining specimens on loan from various Continental herbaria. My thanks are due to the directors of the herbaria at Berlin, Geneva and Upsala for the loan of valuable type specimens without which this work could not have been completed. I have also consulted specimens in the British Museum, the Bolus Herbarium, the South African Museum Herbarium and the National Herbarium, Pretoria, and to the curators of these institutions I tender my thanks for the facilities they have afforded me. Mr. J. P. H. Acock has provided me with specimens from many localities and these have been most useful in studying the range of variability in certain species.

ELYTROPAPPUS Cass. in Bull. Soc. Philom. p. 199 (1816).

*Capitula* few (2-8) flowered, homogamous, discoid. *Involucral bracts* imbricate in few rows, the inner scarious, the outer sometimes woolly or leafy. *Receptacle* naked. *Florets* tubular and regular, usually inconspicuous. *Style branches* pencilled at the summit. *Achenes* beakless and sessile. *Pappus* of several bristles, plumose at the summit and usually united at the base to form a ring, usually with an external rim or, in a few cases, a cup-like outer pappus.



Branched shrubs, frequently glandular. Leaves usually small and ericoid.

An endemic South African genus. Species 8.

# KEY TO THE SPECIES.

- A. Capitula grouped in rounded, terminal heads.
- B<sup>1</sup>. Leaves about 1 cm. long, with conspicuous spiny outgrowths . . . . . 1. *hispidus*.
- B<sup>1</sup>B<sup>1</sup>. Leaves less than 1 cm. long, occasionally with a few glands but not with spiny outgrowths . . . . . 2. *cyathiformis*.
- AA. Capitula not grouped in rounded heads or if heads rounded then not all the capitula confined to the terminal position on the main shoots.
- B<sup>2</sup>. Plants densely glandular.
- C<sup>1</sup>. Pappus bristles free or nearly so, caducous . . . . . 3. *longifolius*.
- C<sup>1</sup>C<sup>1</sup>. Pappus bristles firmly united at the base, not caducous.
- D<sup>1</sup>. Capitula tightly packed in a spike-like inflorescence, rarely groups of capitula stalked. . . . . 4. *glandulosus*.
- D<sup>1</sup>D<sup>1</sup>. Capitula in loose heads, scattered on the upper parts of the branches . . . . . 5. *scaber*.
- B<sup>2</sup>B<sup>2</sup>. Plants with a few scattered glands or none.
- C<sup>2</sup>. Leaves tightly adpressed.
- D<sup>2</sup>. Capitula spicately arranged at the apices of the branches, terminating the shoots; shoots for the next season's growth arising below the inflorescence; inner involucre bracts acute or sub-acute . . . . . 8. *adpressus*.
- D<sup>2</sup>D<sup>2</sup>. Capitula lateral or terminal on side shoots, not terminating the growth of the main axes; inner involucre scales obtuse or sub-acute . . . . . 7. *rhinocerotis*.
- C<sup>2</sup>C<sup>2</sup>. Leaves not tightly adpressed . . . . . 6. *gnaphaloides*.

- I. ELYTROPAPPUS HISPIDUS Levyns in Trans. Roy. Soc. S.A. XXIII p. 93 (1935). *E. spinellosus* Cass. Bull. Soc. Philom. p. 199 (1816) and Dict. Sci. Nat. XIV, p. 376 (1819); DC Prod. VI p. 256 (1837); Harv. in Fl. Cap. III p. 273 (1865); *E. spinulosus* Less. Syn. Comp. p. 343 (1832); *Gnaphalium hispidum* Linn. f. Suppl. p. 363 (1781); Thunb. Prod. p. 148 (1800); Thunb. Fl. Cap. ed. Schultes p. 645 (1823). *Metalsia hispida* Don. Mem. Wern. Soc. V. p. 558 (1826).

Bush about 30 cm. high, not much branched, glabrous or nearly so. Leaves linear, mucronate, closely set, erecto-patent, about 1 cm. long, covered with small spiny outgrowths. Capitula 6—8 flowered, several massed together in terminal rounded heads. Involucre bracts acuminate. Ovary scaberulous. Inner pappus well developed, outer pappus cup-shaped, entire.

NO PRECISE LOCALITY. Thunberg, Bockland!

2. *ELYTROPAPPUS CYATHIFORMIS* DC. Prod. VI p. 257 (1837) ; Harv. in Fl. Cap. III p. 273 (1865). *Cyathopappus metalasioides* Sch. Bip. in Pollichia XVIII-XIX p. 183 (1861).

Small shrub, rarely reaching 30 cm. in height, young branches woolly. *Leaves* woolly when young, the lower surface becoming more or less glabrous with age, linear, revolute, twisted, mucronate with a few, scattered, pedicellate glands. *Capitula* 3—7-flowered, several massed together and forming rounded heads at the ends of the branches. *Involucral bracts* all scarious, outer shorter and somewhat puberulous, especially along the midrib, inner glabrous, rather acute. *Corolla* 3—4 mm. in length, with a narrow tube and 5 narrow, spreading lobes, exceeding the involucral bracts. *Pappus* of about 18 well-feathered bristles, united at the base, sometimes with a very well developed cup-shaped outer pappus, but this latter structure may be absent. *Achene* 2—2.5 mm. in length, narrowed at the base, covered with deep, transverse wrinkles which may or may not extend as far as the annulus or outer pappus (fig. 6).

CLANWILLIAM : Cederberg, Drège 3676 ! CERES : Tafelberg, Schlechter 10103 ! Cold Bokkeveld, Levyns 4887 ! 4919 !

3. *ELYTROPAPPUS LONGIFOLIUS* (DC) Levyns. *E. glandulosus* Less. var. *longifolius* DC. Prod. VI, p. 256 (1837) partly ; Harv. Fl. Cap. III, p. 274 (1865). *Stoebe muricata* Sprgl. (ex. Sch. Bip. in Pollichia XVIII-XIX (1861).

Foliis longis, glandulas pedicellatas gerentibus ; spicis confertis, elongatis, foliosis ; pappo deciduo, setis basi subconcretis aut liberis ; annulo nullo ; achenio squamis deorsum imbricatis, superne obtectis.

Erect shrub, 1 m. high or less, with rather stiffly ascending branches. Young stems densely glandular and somewhat woolly. *Leaves* ericoid, reflexed, with an average length of 7—10 mm., longer in shade forms ; upper surface woolly, lower surface densely glandular-scabrid. *Capitula* 1 or 2 in the axils of the upper leaves, forming a rather dense spicate inflorescence. *Involucral bracts* few, loosely arranged and more or less of the same size, scarious or sometimes one or two of the outer leafy at the tip ; broad, obtuse, sometimes emarginate. *Florets* 3—6, slightly exceeding the involucral bracts. *Pappus* of several rather weak, plumose bristles, about three quarters of the length of the corolla, free or slightly joined at the base, falling off rather easily and when joined showing an uneven line of separation at the base. *Corolla* widening slightly from base to apex, with larger and more reflexed lobes than its immediate allies. *Achene* glabrous, tapering at both ends, without the rim (annulus) which usually characterises the genus, upper part covered with downwardly imbricate, irregular scales (fig. 1).

CAPE : Silvermine, *Pillans* 4341 ! *Levy's* 1440 ! Constantiaberg, *Salter* 280 /17 ! WORCESTER : du Toit's Kloof, *Drège* ! CALEDON : Steenbras, *Galpin* 12563 ! Genadendal, *Burchell* 7615 ! *Burchell* 7879 ! *Drège* (49698 in S.A. Museum) ! *Levy's* 4836 ! *Levy's* 4837 ! WITHOUT LOCALITY : *Forsyth* !

NOTE.—This species differs from all others in the genus in the shape of the corolla, the weakly developed pappus, the absence of an annulus and the peculiar scale-like outgrowths on the upper part of the ovary. This being so it is strange that up to the present it has not been given specific rank.

There are three specimens at Kew collected by Burchell. Two of them are quoted by De Candolle as examples of *E. glandulosus* Less. var. *longifolius*, viz. 7615 from Genadendal and 7695 from Donker Hoek Mountains in the same district. The third specimen, Burchell 7879 from the same locality as 7615 is not quoted. 7615 is clearly a rather young stage of 7879 and this is the plant to which I now propose to give the name *E. longifolius*. Burchell 7695 is similar in vegetative features, but differs in characters of corolla, pappus and achene. It may be a hybrid between *E. longifolius* and *E. glandulosus*.

Two specimens which superficially look like this species, cannot be placed here. They are Phillips 1767 from the Great Winterhoek and Pillans 6795 from the Olifant's River Mountains. Both of these approach *E. gnaphaloides* in floral characters, but in vegetative features are quite unlike that species, their long leaves suggesting *E. longifolius*. *E. gnaphaloides* is present in both areas but there are no records of *E. longifolius*. The true nature of these plants must, therefore, remain uncertain until more is known of the species of *Elytropappus* which are growing in the neighbourhood in each case.

4. *ELYTROPAPPUS GLANDULOSUS* Less. Syn. Comp. p. 343 (1832). Harv. Fl. Cap. III, p. 274 (1865) partly. *E. glandulosus* Less. var. *microphyllus* DC. Prod. VI, p. 256 (1837) partly.

Shrub about 50 cm. high. Young stems slightly woolly, covered by the erect leaves excepting in sheltered habitats where the leaves may stand out from the stems. *Leaves* ericoid, average length 4—5 mm., upper surface woolly, lower surface densely covered with stalked glands. *Capitula* in the axils of the upper leaves, usually forming a narrow, spicate inflorescence, but occasionally with stalked glomerules. *Involucral bracts* scarious, the *outer* sometimes leafy and glandular at the tip, the *inner* occasionally rather woolly on the back, acuminate, about the same length as the florets. *Florets* usually 2, sometimes 3. *Pappus* well developed, persistent. *Corolla* narrow, tubular, with small erect or

slightly reflexed lobes. *Achene* with about 4 longitudinal ribs and a rim-like annulus.

CERES : Cold Bokkeveld, *Levyns* 4898 ! MALMESBURY : Riebeeck Kasteel, *Levyns* 3108 ! TULBAGH : Witzenberg, *Burchell* 8653 ! STELLENBOSCH : Lourensford, *Pillans* (18285 in the Bolus Herbarium) ! CALEDON : Genadendal, *Levyns* 4838 ! SWELLENDAM : *Tradouw*, Mund and Maire !

5. *ELYTROPAPPUS* SCABER, *Levyns* in Trans. Roy. Soc. S. Af. XXIII, p. 93 (1935). *Elytropappus glandulosus* Less. var. *microphyllus* DC. (partly) (1837). *Stoebe scabra* Linn. f. Suppl. p. 391 (1781) ; Thunb. Prod. p. 170 (1800).

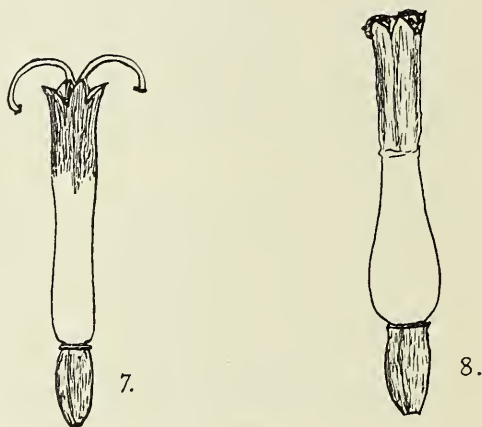


FIG. 7. *Elytropappus scaber* *Levyns*. Flower at the time of pollination (pappus removed)  $\times 14$ .

FIG. 8. *Elytropappus scaber* *Levyns*. An older flower than that shown in Fig. 7. The top of the corolla is shrivelling and the lower part has become globose and fleshy  $\times 14$ .

Divicately branched, wiry shrub up to 1 m. in height, glandular-hispid. Young branches glandular, somewhat woolly near the nodes. *Leaves* ericoid, somewhat adpressed, occasionally slightly twisted, average length 2—4 mm., upper surface woolly, lower surface green, with stout scattered glands. *Capitula* in numerous, loose, rather rounded heads, 5—7 mm. in diam. in the fruiting stage, scattered on the upper parts of the branches, sessile or shortly stalked. *Involucral bracts* in 3 or 4 rows, loosely imbricate, outer rows leaf-like and glandular, the inner rows much longer, scarious, acute or acuminate. *Florets* usually 2, occasionally 3, about equalling the innermost bracts. *Corolla* becoming fleshy and globose at the base during senescence (figs. 7, 8). *Pappus* of about 16



plumose bristles with an inconspicuous annulus. *Style* becoming swollen at the base during senescence. *Achene* glabrous, with rather faintly marked longitudinal ribs.

CERES : Cold Bokkeveld, *Levy* 4897 ! 4904 ! CAPE : *Ecklon* 608 ! Kenilworth, *Flanagan* 2425 ! Muizenberg, *Ecklon* 52 ! *Bolus* 4797 ! *Levy* 4237 ! Kalk Bay, *Wolley Dod* 1006 ! Smitswinkel Bay, *Galpin* 12642 ! WORCESTER : Hex River, *Rehmann* 2680 ! CALEDON : Genadendal, *Levy* 4859 ! BREDASDORP : Mierkraal, *Schlechter* 10507 (partly) ! WITHOUT LOCALITY : *Linnaeus* ! *Ecklon* 836 ! *Drège* !

NOTE.—*Schlechter* 10507 consists of plants most of which appear to be hybrids between *E. scaber* and *E. gnaphaloides*. The only undoubted specimen of *E. scaber* under this number is in the National Herbarium at Pretoria.

6. ELYTROPAPPUS GNAPHALOIDES *Levy* in Trans. Roy. Soc. S.Af. XXIII, p. 94 (1935). *E. ambiguus* DC. Prod. VI, p. 256 (1837) ; *E. canescens* DC. loc. cit. *E. glandulosus* Less. var. *ambiguus*, Harv. Fl. Cap. III, p. 274 (1865). *E. glandulosus* Less. var. *pallens* DC. loc. cit. *Scriphium gnaphaloides* Linn. Mant. I, p. 481 (1770).

A much branched grey shrub, about 60 cm. high, with a more or less scanty covering of wool. Young branches woolly, with a few scattered glands. *Leaves* ericoid, patent, frequently twisted, woolly on upper and lower surfaces ; with a few, stout, scattered glands, average length 4—5 mm. *Capitula* singly or in clusters in the axils of the upper leaves, 5—7 mm. in diam. in the fruiting stage, sessile or stalked. *Involucral bracts* loosely imbricate in 3—4 rows, outer bracts small, leaf-like at the apex, which is woolly and glandular, inner rows much longer, scarious but with traces of wool, on the backs, acute, rarely somewhat acuminate. *Florets* usually 3, sometimes 2, about equalling the innermost bracts. *Corolla* becoming slightly fleshy at the base during senescence. *Pappus* of about 16 rather stout, plumose bristles, with an uneven, conspicuous rim outside, the degree of development of the latter being variable. *Achene* glabrous with several conspicuous, longitudinal ribs, these being most prominent on the inner face, very rarely with the ribs not conspicuous (fig. 4).

CLANWILLIAM : *Ecklon* 182 ! *Ecklon* 560 ! *Ecklon* 630 ! Wupperthal, *Drège* ! Olifants River, *Drège* 5684 ! CERES : Cold Bokkeveld, *Schlechter* 10210 ! *Levy* 4927 ! MALMESBURY : Riebeeck Kasteel, *Levy* 3107 ! CAPE : Table Mountain, *Levy* 4239 ! Mowbray, *Guthrie* 447 ! PAARL : Drakenstein, *Bolus* 4042 ! Dal Josaphat, *Tyson* 848 ! Bains Kloof, *Galpin* 12659 ! French Hoek, *C. A. Smith* 2645 ! WORCESTER : *Rehmann* 2633 ! 2634 ! du Toit's Kloof, *Drège* ! STELLENBOSCH : Kuils River, *Levy*



4238 ! Sir Lowry Pass, *Burchell* 8242 ! *Schlechter* 7816 ! CALEDON : Elgin, *C. A. Smith* 2579 ! Houw Hoek, *Levy's* 4872 ! Genadendal, *Levy's* 4857 ! Greyton, *Levy's* 4866 ! BREDASDORP : Mierkraal, *Schlechter* 10507 (partly) ! MOSSEL BAY : Herbertsdale, *Muir* 2062 ! UNIONDALE : Lauterwater, *Compton* 4228 ! WITHOUT LOCALITY : *Linnaeus* ! *Ecklon* ! *Mund* ! *Sieber* !

7. ELYTROPAPPUS RHINOCEROTIS Less. Syn. Comp. p. 344 (1832). DC. Prod. VI, p. 256 (1837) ; Harv. Fl. Cap. III, p. 274 (1865). *Stoebe rhinocerotis* Linn. f. Suppl. p. 391 (1781) ; Thunb. Prod. p. 170 (1800). *S. cernua* Thunb. Prod. p. 170 (1794). *S. cupressina* Reichb. in Sieber. Pl. exs. Cap 18 (ex DC. Prod. VI p. 257). *Seriphium Rhinocerotis* Pers. Syn. II p. 501 (1807). *S. cernuum* Pers. loc. cit.

A much branched grey or grey-green shrub, from 60 cm. to 2.5 m. high. Young stems shortly and densely woolly, covered with numerous, small adpressed leaves. Leaves minute, obtuse, closely adpressed to the stem, woolly on the upper surface, glabrous or shortly woolly below. Capitula grouped near the apex of lateral branches which may be short or long and cernuous, each capitulum usually with 3 florets. Involucral bracts scarious, sometimes shortly woolly outside, obtuse, or rarely subacute, the innermost row a little shorter than the florets. Florets tubular with small lobes. Pappus well developed. Achene with a few longitudinal ribs which are sometimes very conspicuous, and with a pronounced rim-like annulus which occasionally develops into a cup-like outer pappus (fig. 5).

NAMAQUALAND : O'okiep, *Levy's* 1492a ! CLANWILLIAM : Zeekoe Vlei, *Levy's* 1215 ! CERES : Cold Bokkeveld, *Levy's* 4913 ! 4925 ! MALMESBURY : Groenkloof, *Pillans* 6329 ! Riebeeck Kasteel, *Levy's* 3105 ! TULBAGH : *Burchell* 1025 ! Witzenberg, *Burchell* 8730 ! CAPE : Cape Flats, *Burchell* 159 ! *Pappe* ! Cape Town, *Levy's* 2679 ! PAARL : *Drège* ! STELLENBOSCH : *Burchell* 8730 ! *Levy's* 1443 ! Sir Lowry Pass, *Ecklon* and *Zeyher* ! ROBERTSON : Kogman's Kloof, *Levy's* 70 ! RIVERSDALE : *Levy's* 3071 ! LADISMITH : Seven Weeks Poort, *Phillips* 1455 ! van Wyksdorp, *Levy's* 2635 ! LAINGSBURG : Matjesfontein, *Levy's* 1442 ! SUTHERLAND : *Levy's* 3074 ! OUDTSHOORN : Gamka River, *Bowker* ! PRINCE ALBERT : Zwartberg Pass, *Pocock* S. 37 ! Great Zwartberg, *Drège* ! *Burt Davy* 12725 ! MURRAYSBURG : *Tyson* 335 ! GRAAFF REINET : *Burt Davy* 13477 ! SOMERSET EAST : *Burchell* 3268 ! UNIONDALE : Long Kloof, *Burchell* 4899 ! ALBANY : Grahamstown, *Rennie* 272 ! WITHOUT LOCALITY : *Miller* !

8. *ELYTROPAPPUS ADPRESSUS* Harv. Fl. Cap. III, p. 274 (1865).

A low shrub usually less than 30 cm. high, with whip-like branches. Young stems woolly. *Leaves* ericoid, closely adpressed to the branches, average length about 2 mm., woolly when young but becoming glabrous with age. *Capitula* one to several near the tips of the shoots, terminating their growth, subsequent development taking place by means of lateral branches arising below the inflorescence. *Involucral bracts* in several rows, scarious, innermost row sharply acute, about equalling the florets. Characters of *floret* and *achene* as for *E. rhinocerotis*.

CERES : Cold Bokkeveld, *Levyms* 4228 ! 4903 ! 4926 ! WORCESTER : The Koo, *Levyms* 3898 ! CALEDON : *Burchell* 7815 ! *Levyms* 4856 ! LAINGSBURG : Witteberg, *Compton* 2983 ! UNIONDALE : Long Kloof, *Fourcade* 3827 ! EXACT DIVISION UNCERTAIN (possibly GRAAFF REINET): Klipdrift, Great Karoo, *Schlechter* 2283 !

NOTE.—This species was founded by Harvey who suggested that it might be the same thing as *Seriphium adpressum* DC. I have seen *Burchell* 7573, quoted by De Candolle as *S. adpressum*. Whatever that plant may be, it is not the same thing as *Elytropappus adpressus* Harv. Harvey quotes no actual specimen but his description fits the plants quoted above.

According to Mr. A. Jooste of Houdenberg, in the Cold Bokkeveld, this plant is known to farmers as the “wyfie” rhenoster. It has not the aggressive habits of the rhenoster bush and may be grazed by stock in times of drought.

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